



**Test Papers
Hub.**

QCAA Biology Units 3 & 4 Practice Paper 1

External Assessment 1: Paper 1 — Multiple Choice & Short Response

**Perusal 5 minutes · Working time 90 minutes · Section I: 20 multiple-choice ·
Section II: 30 marks · 50 marks in all**

How to use this booklet

- Perusal time – 5 minutes. Working time – 90 minutes. Write using black pen.
- QCAA-approved scientific or graphics calculators may be used. A formula and data sheet is provided at the back of the paper.
- Section I: 20 multiple-choice questions (1 mark each). Section II: 7 short-response questions (30 marks).
- Worked solutions follow the paper: every question has step-by-step working, a key takeaway and (for multiple choice) a note on why each wrong option is wrong.

SECTION I

20 marks · Attempt Questions 1 – 20 · Allow about 35 minutes

Select the alternative A, B, C or D that best answers the question. Each question is worth 1 mark.

1. A population of 2000 kangaroos at the start of a year has 534 births, 353 deaths, 22 immigrants and 174 emigrants during the year. What is the population at the end of the year?

- A 2181
- B 2029
- C 2377
- D 29

2. Reaction times (s) are: 22.5, 23, 21.9, 16.6, 19, 16.4, 16.1, 17.3. Calculate the mean.

- A 21.8 s
- B 153 s
- C 19.1 s
- D 38.2 s

3. A simplified carbon budget (gigatonnes of carbon per year, GtC y^{-1}): uptake by photosynthesis on land 130; release by plant and soil respiration 62; release by respiration of animals and decomposers (all other land respiration) 59; burning of fossil fuels 8; net uptake by the oceans 2. Calculate the net change in atmospheric carbon (GtC y^{-1}).

- A -3.00 GtC y^{-1}
- B 3.00 GtC y^{-1}
- C 6.00 GtC y^{-1}
- D 261 GtC y^{-1}

4. In a coral reef the producers fix $20000 \text{ kJ m}^{-2} \text{ y}^{-1}$ of energy by photosynthesis (gross primary productivity, GPP). The producers use $12000 \text{ kJ m}^{-2} \text{ y}^{-1}$ in their own respiration. Primary consumers can assimilate 12% of net primary productivity. Calculate the net primary productivity ($\text{NPP} = \text{GPP} - \text{R}$).

- A $32000 \text{ kJ m}^{-2} \text{ y}^{-1}$
- B $8000 \text{ kJ m}^{-2} \text{ y}^{-1}$
- C $12000 \text{ kJ m}^{-2} \text{ y}^{-1}$
- D $20000 \text{ kJ m}^{-2} \text{ y}^{-1}$

5. A student repeats an experiment three times and obtains very similar results each time. This shows that the results are:

- A valid
- B free from systematic error
- C accurate
- D precise (reproducible)

6. Ten randomly placed quadrats, each 1 m², are used to sample mushrooms in a paddock of 1000 m². The counts are 12, 14, 8, 8, 5, 24, 11, 18, 20, 3. Estimate the total number of mushrooms in the paddock.

- A 12300
- B 24600
- C 1.23×10^5
- D 12.3

7. In a cladogram, an outgroup is used to:

- A represent the species with the most characteristics
- B make the tree symmetrical
- C determine which characteristics are ancestral and which are derived
- D show the species that are most recently evolved

8. Part of the template (antisense) strand of a gene reads 3'–TACGTGAAGCCGATT–5'. Use the genetic code on the data sheet. Write the sequence of the mRNA transcribed from this strand.

- A 5'–ATGCACTTCGGCTAA–3'
- B 5'–UACGUGAAGCCGAUU–3'
- C 5'–AUGCACUUCGGCUAA–3'
- D 5'–AAUCGGCUUCACGUA–3'

9. A mutation in the promoter region of a gene is most likely to affect:

- A the structure of tRNA
- B the rate at which the gene is transcribed
- C the number of introns in the mRNA
- D the amino acid sequence of the protein

WORKED SOLUTIONS

Answers & worked solutions

Multiple-choice answer key

1	B	2	C	3	A	4	B	5	D	6	A
7	C	8	C	9	B	10	A	11	D	12	B
13	D	14	D	15	C	16	A	17	C	18	A
19	D	20	B								

SECTION I

1. A population of 2000 kangaroos at the start of a year has 534 births, 353 deaths, 22 immigrants and 174 emigrants during the year. What is the population at the end of the year?
[Ecology]

Correct answer: B — 2029

- population change = (births + immigration) – (deaths + emigration).
- = (534 + 22) – (353 + 174) = 29
- final population = 2000 + (29) = 2029
- Why the other options are wrong:
- A (2181): ignored immigration and emigration
- C (2377): added emigrants instead of subtracting them
- D (29): gave the change in population rather than the final number

LOS: Ecology

KEY TAKEAWAY

Population change = (births + immigration) – (deaths + emigration); growth rate % = change ÷ starting number × 100.

2. Reaction times (s) are: 22.5, 23, 21.9, 16.6, 19, 16.4, 16.1, 17.3. Calculate the mean.
[Scientific investigation]

Correct answer: C — 19.1 s

- mean = sum ÷ n = 152.8 ÷ 8 = 19.1 s
- Why the other options are wrong:
- A (21.8 s): divided by n – 1
- B (153 s): gave the sum
- D (38.2 s): a factor of 2 too large — a common slip in the working

LOS: Scientific investigation